ORDINANCE NO. 11451

AN ORDINANCE TO AMEND CHATTANOOGA CITY CODE, PART II, CHAPTER 32, BY ADDING A NEW ARTICLE XII, RELATIVE TO STANDARDS FOR ACCEPTANCE OF DEDICATED STREETS.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF CHATTANOOGA, TENNESSEE:

SECTION 1. That Chattanooga City Code, Part II, Chapter 32 be and the same is hereby amended by adding a new Article XII as follows:

ARTICLE XII. STREET CONSTRUCTION

Sec. 32-271. Purpose.

The purpose of this Article is to provide specifications and procedures for acceptance of public streets, sewers, stormwater facilities, and other infrastructure dedicated to the public through subdivision plans or otherwise.

Sec. 32-272. Conformity to Official Plans.

When a tract of land to be subdivided includes any part of a proposed road or street shown on the General Plan, Land Use Plan, Major Street Plan, or any other plan adopted by the Planning Commission or City Council, such street right-of-way should be platted by the subdivider in the location so designated, and at the width specified in the subdivision regulations.

Sec. 32-273. Street Construction Standards.

(a) Pavement, cul-de-sac and right-of-way widths and radii must be per City of Chattanooga design and construction standards.

(b) Street pavements shall be designed based on field evaluation of the soil conditions performed by a geotechnical engineer. Pavement design shall be based on the following table:

Subgrade CBR	Surface Asphalt	Binder Asphalt	Base Stone
≥ 5	1 inch	2 inches	6 inches
4	1 inch	2 inches	8 inches
3	1 inch	2 inches	10 inches
≤ 2	Requires special evaluation		

In the event the existing soil conditions are such that obtaining California Bearing Ratio ("CBR") values listed in the above table is impossible, the developer may submit an alternate design prepared by a Tennessee licensed professional engineer for approval in the discretion of the City Engineer.

(c) Preliminary or final plat approval by the Planning Commission does not constitute permission to begin any street or utility construction. The street utility construction plan must be approved as set forth in this article before construction can begin.

(d) Quality assurance during construction will be required. The developer shall select a geotechnical engineering firm from the current Tennessee Department of Transportation ("TDOT") approved list that is not otherwise involved in the project and notify the city of that selection and the rates agreed upon. The city will enter into a contract with the geotechnical firm to provide quality assurance on the project. The developer shall be responsible for scheduling the geotechnical firm. At final acceptance of the project, the developer shall reimburse the city for geotechnical work. Geotechnical firms who wish to provide quality assurance, but are not on TDOT approval list, may submit Form DOT-LS-100 for approval at the discretion of the City Engineer. Minimum testing requirements are described in this article. A final certification by the geotechnical engineer that all tests and inspections have been completed and the construction has been completed in accordance with City of Chattanooga design and construction standards specifications and applicable portions of subdivision regulations will be required.

Sec. 32-274. Grading.

(a) Before grading is started, the areas between the proposed slopes shall be cleared of all trees, stumps, roots, weeds, logs, heavy vegetation, and other objectionable matter, and shall be grubbed to a depth below the proposed grade in cuts and the

natural ground in fills so as to expose suitable subgrade. The objectionable matter shall be removed from within the right-of-way limits and disposed of in such a manner that it will not become incorporated within the fills, nor in any manner hinder proper operation of the storm drainage system.

(b) All suitable material may be used in the construction of embankments or at any other place needed. If rock is encountered, it shall be removed as determined by the geotechnical engineer. Where boulders are encountered, they should be removed 6" below the proposed grade.

(c) The Geotechnical Engineer must complete a field evaluation of the roadway before any roadway construction continues. The Geotechnical Engineer shall obtain samples of the subgrade soils for laboratory evaluation. A composite soil sample of each soil type will be obtained and tested for plasticity (Atterberg limits, ASTM D4318), standard Proctor moisture-density relationship (ASTM D698), and California Bearing Ratio (ASTM D1883). The California Bearing Ratio (CBR) value shall be determined by a three-point test molded to 98 percent of the standard Proctor maximum dry density at a moisture content within 1-1/2 percent of optimum. The subgrade soils shall meet the following minimum requirements:

(1) Standard Proctor Maximum Dry Density $\geq$ 95 pounds per cubic foot.
(2) Liquid Limit $\leq$ 60.
(3) Plasticity Index $\leq$ 30.

(d) If the soils do not meet these requirements, either the subgrade soils must be replaced for a depth of 18 inches with soils that do meet these requirements, or a geotextile must be incorporated into the pavement design as a separation between the subgrade soils and the base stone. Geotextiles shall meet the requirements of Section 32-286.

Sec. 32-275. Utility Construction.

(a) Prior to any base material being placed, all underground work that is to be within the right-of-way or the right-of-way subgrade shall be completed and backfilled with stone, if necessary. This includes all drainage, sewerage, water, telephone, electrical, gas, cable television, and other utilities to the end that

the completed roadway will not be disturbed for the installation of any utility main or service connection for any utility.

(b) Sanitary sewer shall be constructed in accordance with City of Chattanooga Design and Construction standards and Tennessee Department of Environmental Health requirements.

(c) Storm sewers shall be constructed in accordance with Best Management Practices (BMP) and City of Chattanooga design and construction standards.

(d) All utilities shall be installed prior to proof rolling and placement of base material. Installation and backfill shall be observed by Geotechnical Engineer. 33P backfill material shall be tested for compaction in 8-inch lifts as described in Section 32-273.

Sec. 32-276. Subgrade.

(a) All contractors must contact the Geotechnical Engineer prior to beginning subgrade work. This is imperative or the work may not be accepted.

(b) The Subgrade shall be prepared to the lines and grades as designed and staked by the Subdivision Engineer and to correspond to the cross section as indicated on the typical cross section approved by the City Engineer.

(c) After the subgrade has been graded and shaped, it shall be scarified to a depth of 12 inches, then re-compacted to achieve a density of at least 98 percent of the standard Proctor (ASTM D698) maximum dry density. The moisture content shall be within three percent (3%) of the optimum moisture content. The Geotechnical Engineer will conduct field density tests at a spacing of not more than 100 feet, staggered right and left of the centerline, with a minimum of 3 tests. Any areas that do not meet compaction requirements shall be re-compacted and retested. If an existing sub grade passes both the proof rolling and density tests then scarifying and re-compacting will not be required. Proof rolling shall be performed using a fully-loaded, dual-tandem dump truck. The subgrade shall be trafficked by parallel passes of the truck starting at one side of the roadway. Each pass shall overlap the preceding pass to ensure complete coverage. Two complete proof rolling coverages are required.

Sec. 32-277. Embankments.

(a) Any street, upon which an embankment is to be constructed, having more than a 3 to 1 slope, shall be specially designed by a geotechnical engineer and then built to design specifications.

(b) The embankment shall be protected from erosion using stormwater Best Management Practices.

Sec. 32-278. Base.

(a) All contractors must contact the Geotechnical Engineer prior to beginning the base operation. This is imperative or the work may not be accepted.

(b) Before placing base material, the subgrade shall be proof-rolled in the presence of the Geotechnical Engineer. Proof-rolling shall be performed using a fully-loaded, dual-tandem dump truck. The subgrade shall be trafficked by parallel passes of the truck starting at one side of the roadway. Each pass shall overlap the preceding pass to ensure complete coverage of the roadway cross-section. Two complete proof-rolling coverages are required. Any areas that deflect or yield, in the opinion of the Geotechnical Engineer, shall be corrected before base material is placed.

(c) Base material shall be a dense-graded mineral aggregate base meeting the requirements of the Tennessee Department of Transportation "Standard Specifications for Road and Bridge Construction" section 303, Type A Grade D. The contractor shall provide a letter of certification from the base material supplier that the materials meet these requirements. Other types of base material may be used, if included in a design by a professional engineer and approved by the Geotechnical Engineer and the City Engineer. The base material shall be compacted to at least 95 percent of the standard Proctor maximum dry density.

(d) The base will be tested for thickness and compaction by the Geotechnical Engineer. Tests will be conducted at a maximum spacing of 200 feet, staggered right and left of the centerline. The minimum base thickness shall be at least equal to the design thickness. Any areas that do not meet these requirements shall be corrected before asphalt can be placed.

Sec. 32-279. Prime.

(a) After the base course has been thoroughly compacted and worked to the lines and grades as shown on the typical cross section, it shall be dampened if necessary.

(b) TDOT approved Asphalt Emulsion primers may be used. Application shall be in accordance with manufacturers recommendations.

(c) The type and grade of prime material shall depend on the condition of the base course and shall be approved by the Geotechnical Engineer.

Sec. 32-280. Binder.

(a) All contractors must contact the Geotechnical Engineer prior to beginning the binder course installation. This is imperative or the work may not be accepted.

(b) The binder asphalt shall be placed over the prime coat. The binder asphalt shall be compacted to at least 92 percent of the bulk specific gravity as determined by the Marshall method (50-blows). The bulk specific gravity shall be provided by the asphalt binder supplier. The Geotechnical Engineer will test the thickness and compaction by obtaining cores every 500 feet, or a minimum of 3 cores. If any area does not meet the minimum thickness or compaction requirements, additional cores will be taken at 100-foot intervals until two consecutive cores meet the requirements. Areas that do not meet the requirements shall be removed and replaced. As an option, the Geotechnical Engineer can be present during construction to check the laydown thickness and temperature of the asphalt and to conduct nuclear density tests after compaction. In this case, coring will be reduced to three cores or one every 2000 feet. In any case, a minimum of three cores will be required.

(c) The binder asphalt shall meet the requirements of TDOT standard specifications section 307. Either 307B, 307BM or 307BM-2 mixes may be used. If 307B is used, the binder thickness must be increased to 2-1/2 inches.

Sec. 32-281. Backfill Curbs.

Backfill behind curbs shall be completed promptly after the curbs are installed. Until the backfill behind curbs is completed, measures should be taken to minimize infiltration of water to the pavement sub grade. Careful attention must be given to slope of backfill to prevent water penetration behind curbs. Curbs shall be installed in accordance with standard City specifications as established by the City Engineer.

Sec. 32-282. Tack Coat.

A tack coat shall be applied over the binder before placing the surface asphalt. The tack coat shall be CRS-2 emulsified asphalt, applied at a rate of 0.05 gallons per square yard of residual bituminous material.

Sec. 32-283. Surface.

(a) The surface asphalt shall be placed over the binder asphalt as soon as possible, but no more than 10 days after placing the binder, to avoid rainwater infiltration and to prevent damage from truck traffic. The time may be extended at the City Engineer's discretion to deal with unusual circumstances, so long as the road continues to meet the structural requirements of this regulation. The minimum thickness of surface asphalt shall be 1 inch. The surface asphalt shall be compacted to at least 90 percent of the theoretical specific gravity as determined by the Marshall method (50-blows). The bulk specific gravity shall be provided by the asphalt supplier. The Geotechnical Engineer will test the thickness and compaction by obtaining cores every 500 feet, or a minimum of 3 cores. Areas that do not meet the requirements shall be removed and replaced. As an option, the Geotechnical Engineer can be present during construction to check the laydown thickness and temperature of the asphalt and to conduct nuclear density tests after compaction. In this case, coring will be reduced to three cores or one every 2000 feet. In any case, a minimum of three cores will be required.

(b) The surface asphalt shall meet the requirements of TDOT standard specifications section 411. 411E mix with river sand shall be used.

Sec. 32-284. Seasonal Limitations of Asphalt.

The outside temperature away from artificial heat and in the shade shall be 35° and rising for plant mix.

Sec. 32-285. "As Built" Drawings.

(a) Upon completion of the construction of the required improvements, and prior to final acceptance by the City Engineer, the developer will furnish "As Built" drawings of all sanitary sewer and stormwater structures. A registered professional engineer or surveyor will certify that the information furnished is a true and complete representation of the improvements that were constructed by the developer. The "As Built" drawings shall be furnished in electronic format, and shall be the true and accurate location and elevation of the structures shown, with a positional tolerance of 0.07 feet horizontal and 0.14 feet vertical. English units and NAD 83 State Plane co-ordinates shall be used. Structures shall be identified by the number shown on the drawing or provided by the engineer. The electronic file, in ASCII format, shall provide the following minimum information for sanitary sewer manholes and drainage structures, including drainage manholes:

(1) Sanitary Sewer Manhole or Drainage Structure Number

(2) Northing, Easting, and Rim Elevation

(3) Invert Elevation

(4) Size, material, and direction for each pipe entering and leaving the sanitary sewer manhole or drainage structure

(b) All drainage structures and sanitary sewer manholes shall be located by the center of the structure or the manhole cover when fully seated.

(c) The electronic file, in ASCII format, shall provide the following minimum information for stormwater detention basins when constructed as part of the development;

(1) Detention Basin Number

(2) Northing, Easting, and Elevation of limits of detention basin

(3) Northing, Easting, and Elevation of bottom of detention basin

(4) Northing, Easting, and Elevation of corners of overflow structure

(5) Invert Elevation, size, material, and direction for each pipe entering and leaving the detention basin.

Sec. 32-286. Geotextiles.

Geotextiles may be incorporated into pavement designs if necessary for subgrade soil conditions that do not meet the requirements of Section 32-276. Geotextiles may also be incorporated into pavement designs for low subgrade CBR conditions (CBR < 3) or if desired by the developer. Geotextiles shall meet the requirements of AASHTO M288-96 (or more recent editions). Geotextiles shall meet MARV strength values for Class 2 if the subgrade CBR > 3 and Class 1 for CBR $\leq$ 3.

Sec. 32-287. Optional Rigid Pavements.

The developer may choose to construct (concrete) rigid pavements instead of flexible (asphalt) pavements. Rigid pavement shall be designed and constructed to meet the following requirements:

(a) Grading: The grading requirements shall be the same as Section 32-274, except the requirements for liquid limit and plastic index are not applicable. The soils shall have a minimum CBR of 3.

(b) Subgrade: The subgrade requirements shall be the same as Section 32-276.

(c) Base: The base requirements shall be the same as Section 32-278. The base thickness shall be a minimum of 4 inches.

(d) Concrete Mix: The concrete mix shall be designed to provide a 28-day compressive strength of 4,000 pounds per square inch with a 4-inch ($\pm$1) slump and maximum water cement ration of 0.45. An air entraining agent shall be added to achieve a 5

percent air content. The concrete mix shall have a nominal maximum aggregate size of 1-1/2 inches.

(e) Concrete Design: The concrete thickness shall be 6 inches. Reinforcing is not required. Control joints shall be spaced regularly in a square pattern as per the PCA recommendations. A longitudinal joint shall be constructed along the centerline. Lateral joints shall be spaced the same as the lane width. Joints shall be sealed using an approved joint sealer. The joint sealer shall be submitted to the Geotechnical Engineer for approval before installation.

(f) Concrete Placement: Concrete placement shall be according to ACI 304 *Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete*. Concrete shall be placed directly on the base. The ambient temperature at the time of placement shall be at least 40 degrees F, and the forecast temperature in the first 24 hours after placement shall be at least 32 degrees. No standing water or frozen base shall be present at the time of placement. The concrete mix is expected to arrive at the site at the correct slump. If trucks arrive with a slump more than 1 inch below the specified slump, then a maximum of 20 gallons of water may be added, with the approval of the concrete supplier, to adjust the concrete slump. No water may be added after placement begins. If trucks arrive with a slump more than 1 inch above the specified slump, the truckload shall be rejected. Concrete shall be placed within 90 minutes of the batch time.

(g) Concrete Protection and Curing:

(1) Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 305R for hot-weather protection.

(2) Curing shall be accomplished in strict compliance with ACI 308.

(h) Finish: The concrete finish shall provide a durable, smooth surface, free of irregularities, but skid-resistant (such as burlap drag or broom finish).

(i) Quality Assurance: An ACI certified representative of the geotechnical engineer shall be present to monitor concrete placement and conduct quality assurance testing. The

representative shall keep a record of each truck load of concrete delivered to the site, including the information provided on the batch ticket and the amount of water added at the site. The first load of concrete shall be checked for slump, air content, and unit weight to determine acceptance. Compressive strength samples shall be taken randomly from the first 30 cubic yards, and every 50 cubic yards after that. Compressive strength samples shall include a set of 6 cylinders. Two cylinders shall be tested at 7 days and 2 at 28 days and 2 for reserve. The remaining cylinder shall be kept in reserve. Slump and air content tests shall be conducted for each set of compressive strength samples taken, or if visual indications of changes in the slump or other concrete properties are observed.

Sec. 32-288. Plan Review and Preconstruction Conference.

(a) Prior to any street or utility construction, five sets of engineering plans for road and utility construction shall be submitted to the Development Office to be stamped with a sign-off block for each department reviewing these five sets of proposed plans.

(b) The design engineer shall make any revisions or changes required by the various reviewers to bring the proposed design into conformance with the City of Chattanooga design and construction standards and the City of Chattanooga Subdivision Regulations. The design engineer should then affix his seal and signature to the five revised plans and return these revised plans to the Development Office for final review and approval.

(c) N.P.D.E.S., A.R.A.P., T.V.A, Corps of Engineers, and other required permits and approvals, if necessary, should accompany these revised plans.

(d) A preconstruction conference shall be held prior to beginning construction on a new subdivision involving street construction work, sanitary sewer, or stormwater facilities. The conference shall be attended by the developer, the contractors, a representative of the City, and the geotechnical engineer.

SECTION 2. BE IT FURTHER ORDAINED, That the operative date of Article XII, Street Construction, shall be October 1, 2003.

SECTION 3. BE IT FURTHER ORDAINED, That this Ordinance shall take effect two (2) weeks from and after its passage, as provided by law.

PASSED on Third and Final Reading

September 2, 2003.

S/_____
CHAIRPERSON

APPROVED: X DISAPPROVED: _____

DATE: September 4, 2003

S/_____
MAYOR

Reviewed By: s/_____
David Eichenthal

PAN/MAM/add